What happens in laboratories becomes part of our lives.

The development of new, ground-breaking medicines that make us healthier. Quality control for the food we eat, the beverages we drink and the water we depend on. Solutions for the safety of plastics, polymers, and synthetics that become the clothes we wear, the toys our children play with. Early detection and treatment of diseases. Higher standards for a cleaner environment.

It all begins with the analytical technologies from Waters—and the science of what’s possible.

To discover what’s possible in your world, visit waters.com.
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Industries

Designed by

scientists for scientists

Purposeful innovations are always the result of a collaborative vision.

Chemical Materials

We offer comprehensive solutions for the characterization of chemical materials that help manufacturers cost-effectively accelerate the development of new products, improve the efficiency of manufacturing processes, and ensure final product quality.

Clinical

Waters® medical devices offer clinical diagnostic laboratories an alternative to LC-MS/MS systems manufactured for clinical research use only. Our MassTrak™ range of integrated system solutions provide improved accuracy and precision resulting in the highest quality results.

Environmental

We have a unique and thorough understanding of the specialized needs of environmental testing laboratories. Whatever the challenge — sample throughput, trace detection, complex matrices, data management, or regulatory compliance — Waters has a solution.
How do you stay at the forefront of your industry?

Which analytical issues cause you the most concern?

Whatever the industry, whatever the challenges, Waters’ world-leading solutions will help drive you to the answer.

Built on the shoulders of ground-breaking technology, Waters’ unrivaled expertise encompasses the following industries:

- **Food**
  A leader in developing food testing systems, Waters’ comprehensive solutions enable food laboratories to identify diverse chemical compounds, meet compliance requirements, decrease operational costs, increase productivity, and, most importantly, help ensure public safety.

- **Pharmaceutical and Life Sciences**
  No company knows more about creating an innovative, commercially successful drug research and development pipeline than Waters. No matter your organization’s role in the industry, Waters can show you how to manage costs, expand analytical capabilities, boost productivity, and drive scientific advancements.

Waters offers a comprehensive approach that includes instrumentation, columns and sample preparation, analytical standards and reagents, software, and support services. With a keen understanding of our customers’ challenges, each system solution is customized to your particular industry and your specific application.
The ACQUITY® Advanced Polymer Chromatography™ System (APC™) defines a new category of chromatographic polymer analysis that gives you more information about your polymers faster than ever before. Combining low-dispersion system fluidics (including refractive index detection) with rigid, small particle columns of a wide range of pore sizes, the system defines the ultimate in polymer peak resolution, particularly for low molecular weight oligomers.

Paradigm™ Scientific Search Software enables fast, easy, high value searches of biological and chemical information across enterprise information repositories to provide vital information to scientists, engineers, managers, and executives in science-based organizations. Easy access to critical information helps drive product innovation, development, and manufacturing to improve time to market.
The ACQUITY UPC²™ System dramatically improves your laboratory’s workflow by providing selectivity unmatched by any other chromatographic technique. While enabling you to address routine and complex separation challenges, UPC²™ Technology delivers reliability, robustness, sensitivity, and throughput never before possible.

The ACQUITY Refractive Index Detector is now available for all UPLC® Systems. This detection technology has been optimized for the challenges of UPLC detection. Its low-dispersion performance matches the requirements of isocratic UPLC separations to bring you detection and reliable quantification of non-UV absorbing analytes such as polymers, sugars, saccharides, fatty acids, and alcohols.
The Prep 150 LC System is the perfect combination of intuitive ChromScope™ Software and robust performance. Available as an automated or a manual system, it is perfectly suited for initial workflow criteria where rapid preparative separations of complex mixtures are required.

The Xevo® G2-S QTof is designed for scientists who need to identify, quantify, and confirm the broadest range of compounds in the most complex and challenging samples. This mass spectrometer delivers superior UPLC-compatible mass resolution, matrix-tolerant dynamic range, quantitative performance, mass accuracy, and speed of analysis – simultaneously.
Omics Research Platform Solution combines our state-of-the-art UPLC/MS and UPLC/HDMS™ instruments with simple, scalable TransOmics™ Informatics in collaboration with our partner, Nonlinear Dynamics. This powerful combination unlocks information utilizing a common, easy-to-use workflow across all applications — from proteomics to metabolomics to lipidomics — delivering faster, more accurate results than ever before. Scientists now have a streamlined approach to conduct high-quality experiments in biomarker discovery and validation, perfect for pharmaceutical and life sciences research, as well as applied research in the food and clinical markets.
Biopharmaceutical Platform Solution with UNIFI® integrates robust UPLC/MS characterization technology with the UNIFI Scientific Information System. UNIFI is an industry-first comprehensive software solution that unites all aspects of biotherapeutic analyses and workflows, enabling organizations to apply high-resolution analytics across the development process continuum. This application-focused platform, featuring ACQUITY UPLC® H-Class Bio and Xevo G2-S QTof and Tof technologies, captures complex mass spectrometry and chromatography data, in conjunction with next-generation bioinformatics and GxP data management capabilities.

Regulated Bioanalysis Platform Solution with UNIFI meets the worldwide call for new, ground-breaking drugs with a future-focused DMPK platform. By combining the industry-leading Xevo TQ-S or TQD mass spectrometers with ACQUITY UPLC systems, the globally standard Oasis® and Ostro™ Sample Preparation Technologies, and UNIFI Software, Waters is ready to enable your laboratory to drive faster development of large and small molecules both in bioanalysis and metabolism studies.
Metabolite Identification Application Solution with UNIFI is the world’s most comprehensive metabolite identification system. It assists the biotransformation scientist with identifying and characterizing metabolites in both discovery and development environments in an unprecedented manner. This application solution brings unparalleled ease and efficiency to routine Met ID processes. As a consequence, scientists can rapidly derive results from complex data sets, and focus their time and skill on efforts that fuel and accelerate the discovery and development process.

Screening Platform Solution with UNIFI is comprised of world-class chromatography and mass spectrometry instruments, software, standards and reagents, and chemistries designed to work together seamlessly to produce accurate data and results. The solution enables all laboratory functions to work with a common backbone of analytical information comprised of successful methods, processed results, and historical data and reports.

Pesticide Screening Application Solution with UNIFI delivers the ease-of-use, sensitivity, stability, reproducibility, and throughput scientists need to successfully and profitably perform pesticide residue screening in compliance with regulatory requirements. Now you can reliably report the presence and absence of pesticide residues, easily streamline workflows, and increase the speed of analysis of complex matrices.
Waters Analytical Standards and Reagents focus entirely on preparation, testing, documentation, and qualification of standards and reagents.

Quality Control Reference Materials (QCRM) Why continue making your own standards when Waters makes it easier? Waters ready-to-use quality control reference materials (QCRM) are the simplest and fastest way to understand your LC or MS system’s health by trending system performance and troubleshooting issues. QCRMs can be seamlessly integrated into your analytical process to provide reliable results, increased accuracy, maximized productivity, and improved compliance. To learn more, visit www.waters.com/QCRM

Waters Certified Clean Containers are uniquely processed, treated, and certified to the same level as our highly regarded low TOC vials. Ultra-clean containers can be used on any LC system, including UPLC, LC/UV, and LC/MS, among others. Manufactured to stringent standards, they prevent extraneous peaks and baseline noise stemming from high TOC, glass chemistry interference, and glass degradation due to glass matrix hydrolytic attack. Other products include everyday solvents, additives and modifiers, instrument diagnostic standards, system performance standards, and application specific standards.

Confidence from Waters
- Analytical standard and reagents inspired, developed, and tested through Waters’ expertise.
- All products are manufactured and traceable to exacting specifications and accompanied by the highest level of accreditation and documentation.
- Integral to true end-to-end platform and application solutions, offering Waters’ fully integrated workflows for a wide range of laboratories.

Confidence in Your Results
- Controls, calibrators, and reagents for all chromatography and mass spectrometry needs.
- Certified product traceability through source, purity, and composition.
- Achieve productivity gains with ready-to-use, stable reagents and standards that optimize laboratory workflow.
Consumables
HPLC and SFC Column Solutions

Waters continues to be at the forefront of materials science as applied to chromatographic media. Ongoing particle substrate, bonded phase, and column hardware innovations empower separation scientists to realize the business and scientific benefits that Waters LC and SFC column technologies provide.

**eXtended Performance [XP]**

2.5 μm Columns

XBridge™ and XSelect™ eXtended Performance [XP] 2.5 μm Columns are high-efficiency HPLC columns that can be easily utilized across all HPLC, UHPLC, and UPLC Technology platforms. **XP** 2.5 μm Columns bridge the gap between HPLC and UPLC and provide equivalent backpressure and superior performance to similarly-sized, superficially-porous HPLC columns. **XP** 2.5 μm Columns offer unmatched selectivity choices with three fully-scalable particle substrates (Ethylene Bridged Hybrid (BEH), Charged Surface Hybrid (CSH™), and High Strength Silica (HSS)), 14 chemistries (C₁₈, Phenyl-Hexyl, C₈, Shield RP18, HILIC, Amide, Fluoro-Phenyl, Cyano, and PFP), and more than 180 column configurations.

**XSelect Columns**

The XSelect family of HPLC columns is designed and optimized for selectivity by utilizing a multi-particle strategy to solve the most complex reversed-phase separation challenges. XSelect Columns combine a carefully chosen selection of eight bonded phases (C₁₈, Phenyl-Hexyl, Fluoro-Phenyl, Cyano, and PFP) with two robust and fully-scalable particle substrates (Charged Surface Hybrid (CSH) and High Strength Silica (HSS)). XSelect HPLC Column benefits include high analyte loading, enhanced compound retention, superior peak shape, wide selectivity range, and seamless scalability between UPLC, analytical HPLC, and preparative HPLC.

Order your 2013 Waters Quality Parts®, Chromatography Columns, and Supplies Catalog at **www.waters.com/catalog**
XBridge Columns

XBridge HPLC Columns continue to set the industry standard for pH stability, efficiency, and LC/MS performance. XBridge Columns offer superior pH stability over the widest range (pH 1-12), along with high efficiencies and symmetrical peak shapes. The XBridge Column chemistries (C\textsubscript{18}, C\textsubscript{8}, Phenyl, Shield RP18, HILIC and Amide) provide the stability necessary for long, predictable column lifetimes under extreme conditions. XBridge HPLC Columns are based upon the same rugged BEH particle technology present in ACQUITY UPLC BEH Columns, and like XSelect Columns, XBridge Columns offer a seamless method migration path between UPLC, analytical HPLC, and preparative HPLC.

Viridis Hybrid SFC Columns

Viridis® Hybrid SFC Columns, based on patented Ethylene Bridged Hybrid (BEH) particle technology and Charged Surface Hybrid (CSH), offer high sensitivity and resolution with excellent peak shape. They are available in three surface chemistries (BEH 2-Ethylpyridine (2-EP), BEH, and CSH Fluoro-Phenyl) and 5 µm particle size, which provide a wide range of selectivity for achiral separations. Purification scientists can scale up to Viridis Hybrid 5-µm Preparative Columns packed using patented Optimum Bed Density (OBD™) Technology for unmatched column lifetimes.
More and more organizations have realized the benefits of improved productivity, higher data quality, and lower cost per sample, as well as faster time-to-market, inherent in assays that utilize UPLC Technology. For these reasons, Waters continues to develop new and innovative UPLC Column chemistries.

ACQUITY UPLC Columns and VanGuard™ Pre-Columns

The ACQUITY UPLC Column family continues to evolve and expand and now includes seven particle substrates (BEH 125Å, BEH 130Å, BEH 200Å, BEH 300Å, BEH 450Å, HSS, and CSH) with 24 chemistries, including seven application-directed UPLC chemistries for SEC, amino acid analysis, proteins, peptides, oligonucleotides, and glycan analysis. With the number of UPLC Column selectivity choices for small molecule and biopharmaceutical applications continuing to grow, Waters has a UPLC Column solution to meet your application needs.

ACQUITY UPLC CSH (Charged Surface Hybrid) Columns are designed to maximize chromatographic selectivity and LC/MS mobile-phase performance and are available in C_{18}, Fluoro-Phenyl, and Phenyl-Hexyl chemistries. The rugged and pH-stable ACQUITY UPLC BEH Columns include C_{18}, C_{8}, Shield RP18, Phenyl, HILIC, Amide, SEC 125Å, SEC 200Å, SEC 450Å, 300Å C_{18}, and 300Å C_{4} chemistries. ACQUITY UPLC HSS Columns (available in C_{18}, C_{18} SB, T3, PFP, and CN chemistries) offer the highest retentivity and widest selectivity range. All Waters ACQUITY UPLC Columns are designed, tested, and guaranteed for routine use in applications up to 18,000 psi (1241 bar).

Available in more than 200 combinations of column configurations and chemistries, ACQUITY UPLC Columns combine faster separations with higher resolution and sensitivities by harnessing the full potential of small particles. For UPLC Column protection, VanGuard Pre-Columns feature an ultra-low volume pending design that efficiently prolongs ACQUITY UPLC Column lifetimes in demanding applications with challenging and variable sample quality.
Method Transfer Kits

Method Transfer Kits are designed to preserve the integrity of a separation as it is transferred between UPLC and HPLC platforms. Based on the concept of maintaining column length (L) to particle size (dp) ratio (L/dp), these kits provide an ACQUITY UPLC Column with an HPLC column of equivalent selectivity and resolving power. Using the ACQUITY UPLC Columns Calculator, methods can be fully transferred from HPLC to UPLC or from UPLC to HPLC.

Method Development Kits

With a seemingly endless number of method parameters to try, developing a new chromatographic method can be an overwhelming and time-consuming experience. Waters Method Development Kits consist of several UPLC Columns, encompassing a broad range in selectivity to accommodate your method development approach and enable more efficient and effective method development.

Method Validation Kits

With exceptional batch-to-batch and column-to-column reproducibility, Waters well-established particle and column manufacturing process control provides confidence in the long-term reliability of your analytical method. ACQUITY UPLC Method Validation Kits include three batches of chromatographic media (derived from different base particles) to judge the quality, reliability, and consistency of your chromatographic method.

Learn about the techniques and technologies of analytical sciences. View our Primers at [www.waters.com/primers](http://www.waters.com/primers)
Waters is dedicated to finding solutions to challenges in the polymer and plastics industries. Advanced Polymer Chromatography (APC) is a breakthrough technology that defines a new category of chromatographic polymer analysis, and addresses these challenges. See more information about polymers, faster than ever before.

**ACQUITY APC Columns**

ACQUITY APC™ Columns deliver the highest chromatographic resolution available for synthetic polymer and macromolecular characterization. Based on robust Ethylene Bridged Hybrid (BEH) Technology, the new ACQUITY APC Column family combines faster separations with higher resolution and sensitivity that is unmatched when compared to conventional GPC separations.

ACQUITY APC Columns deliver superior chromatographic performance for all polymer classes, including low molecular weight aqueous and organic soluble polymers, up to a molecular weight of 2,000,000 Da.
In 2012, Waters introduced Convergence Chromatography (CC), a new category of separation science that provides an exceptional increase in selectivity to the chromatographic laboratory. UltraPerformance Convergence Chromatography™ (UPC²) is a holistically designed chromatographic technology that utilizes compressed CO₂ as the primary mobile phase to leverage the chromatographic principles and selectivity of normal-phase chromatography while providing the ease-of-use of reversed-phase LC. An integral part of the ACQUITY UPC² System, ACQUITY UPC² Columns allow scientists to address routine and complex separation challenges while delivering the reliability, robustness, sensitivity, and throughput never before possible for this analytical technique.

**ACQUITY UPC² Columns**

The reduction and control of surface silanol activity on ACQUITY UPC² particles delivers excellent peak shapes—without the use of mobile-phase additives—even for well-retained basic achiral compounds. The four available surface chemistries extend the selectivity range of CC separations and include: BEH 2-EP for good retention, peak shape, and selectivity; BEH for heightened interaction with polar groups such as phospholipids; CSH Fluoro-Phenyl for good retention of weak bases, and an alternate elution orders for acidic and neutral compounds; and HSS C₁₈ SB for analysis of glycerides (used in pharmaceutical, food, and chemical applications). Available in sub-2-μm and 3.5-μm particle size chemistries—providing maximum flexibility to tackle challenging routine analysis.
Consumables
Bioseparations and Analyses Solutions

Waters is dedicated to providing innovative UPLC solutions as well as traditional HPLC-based offerings for the separation, analysis, and characterization of DNA/RNA, amino acids, peptides, proteins, and glycans. Beginning with a keen understanding of today’s biomolecule-related challenges, Waters chemistry operations scientists and engineers continuously seek purposeful innovations that help deliver impactful solutions in applications, ranging from proteomics and biomarker discovery through the commercialization of advanced biopharmaceuticals.

Biomolecule Separation Technologies

- Peptide Separation Technology Columns including the latest MS-compatible, CSH130, C_{18} offerings and peptide standards for nano, capillary, analytical, and preparative peptide applications.
- Protein Separation Technology BEH-based SEC and ProteinPak™ Hi Res IEX Columns and Protein Standards for UPLC-based solutions, and BioSuite™, SEC, IEX, RP, and HIC columns for HPLC-based applications.
- AccQ•Tag™ Ultra chemistry specific for Waters UPLC Amino Acid Analysis Solution; and Pico•Tag® and AccQ•Tag offerings with amino acid standards for HPLC-based amino acid analyses.
- Oligonucleotide Separation Technology columns and standards for the analysis and lab-scale isolation of synthetic oligonucleotides and DNA/RNA fragments.
- Glycan Separation Technology sample preparation kits, standards, and column offerings for UPLC or UPLC/MS analysis of labeled glycans.
- Synthetic oligonucleotide, amino acid, peptide, protein, and glycan standards that help ensure required system and column performance prior to valuable sample analyses.
Harness Waters technologies for bioseparations and analyses.
Consumables
Sample Preparation Solutions

Waters offers comprehensive solutions to solve all sample preparation challenges. As the stringent requirements for higher sensitivity, selectivity, accuracy, precision, and the number of samples to be processed continue to escalate, the corresponding increases in speed and sophistication of analysis and data collection have outpaced improvements in the many traditional techniques of sample collection and preparation. Waters, efforts are focused on providing products to streamline sample preparation protocols.

Oasis SPE Products
Oasis products combine revolutionary sorbents with innovative hardware, and are the preeminent choice in solid-phase extraction (SPE). Chosen for their reliable, highly selective performance, Oasis products are used by separation scientists across the globe to solve their most difficult sample preparation challenges. Researchers rely on the superior technical performance of these products to achieve unmatched purity, consistency, and quality in their sample preparation methods.

Ostro Sample Preparation Products
The Ostro Plate provides a simple solution for the cleanup of plasma samples. Requiring minimal to no method development, this technology is easy to integrate into your laboratory’s workflow. The Ostro Plate produces cleaner sample extracts, resulting in more sensitive analyses, higher sample throughput, reduced instrument downtime, and increased laboratory productivity.
**Sep-Pak SPE Products**

Sep-Pak® cartridges and plates are recognized around the world and remain the most referenced solid-phase extraction (SPE) product for sample preparation. A diverse selection of formats and sorbents make Sep-Pak SPE products ideally suited for all types of samples for GC, HPLC, and UPLC analysis methods.

**DisQuE Dispersive Sample Preparation (QuEChERS)**

DisQuE™ dispersive sample preparation products are conveniently packed with pre-weighed sorbents and buffers in pouches and tubes as described in regulatory methods and protocols.

**PoraPak Rxn Products for Post Synthesis Cleanup**

PoraPak™ Rxn, designed for reaction cleanup in drug discovery, comes pre-packed in a range of sizes and is offered in bulk for the scale of reaction needs.

**Waters Certified Vials**

Waters’ vials are certified for cleanliness by HPLC and LC/MS testing. The new TruView™ LCMS Certified Vials are the only vials tested and certified for analyte recovery by UPLC/MS/MS and made by a proprietary manufacturing process that minimizes adsorption to the class surface. These vials fit Waters ACQUITY UPLC and Alliance HPLC systems, as well as most other autosamplers on the market.

**Pall Life Sciences Sample and Solvent Filtration Products**

Waters offers a range of different membranes for solvent and sample compatibility. Filtration formats include apparatus for filtering solvents, and Acrodisc syringe filters for sample filtering needs.

**Sirocco 96-Well Filtration Plates**

Sirocco™ eliminates time-consuming, extra sample-handling steps traditionally done with classical protein precipitation. Providing efficient sample processing for clear filtrates from small sample volumes, these plates can be automated to process large numbers of samples efficiently.

To select the best vial, filter, or plate for your system and application, visit [www.waters.com/apps](http://www.waters.com/apps)
“We have reduced our paper shuffle by about 90% at AIT due to Waters NuGenesis SDMS... now the opportunity for collaboration is electronic, immediate, and accurate.”

Thieme R.
VP and CIO
AIT Laboratories
Informatics and Software

Waters Laboratory Informatics Software converts scientific data into useful information to drive your business success. It comprises a powerful suite of solutions for instrument control, scientific data management, scientific search, network integration, and compliance management to streamline analytical laboratory operations.

Our Informatics solutions have helped leading pharmaceutical, environmental, food and beverage, and chemical materials organizations reduce costs, accelerate decision making, improve laboratory effectiveness, and get products to market faster.

Applications

- Automatic information capture, cataloging, and archiving from a wide variety of data sources
- Documentation of observations and control procedures
- Guide analysts through laboratory method standard operating procedures (SOPs)
- Management and tracking of samples
- Instrument and reagent inventories
- Management of the entire scientific data lifecycle
- Instrument control, data acquisition, and processing
- Automation and streamlining laboratory workflow
- Compliance management, data security, and traceability
- Easy access to enterprise-wide scientific information
- At-a-glance views of key chromatography data
- Remote access to key chromatography data

Key Technologies

- NuGenesis® 8 featuring LE (Laboratory Execution) Technologies; includes NuGenesis SDMS and NuGenesis ELN
- Empower® Chromatography Data Software (CDS) and Method Validation Manager (MVM)
- MassLynx® Mass Spectrometry Software and Application Managers
- Paradigm Scientific Search Software
- Fusion Method Development™ Software from S-Matrix
- UNIFI Scientific Information System, available as part of complete platform and application solutions including Biopharmaceutical, Regulated Bioanalysis, Screening, Metabolite Identification, and Pesticide Screening
- TransOmics Informatics for Proteomics
- TransOmics Informatics for Metabolomics and Lipidomics
Deriving sustainable polymers and maintaining a sustainable operation are two of the utmost challenges facing the polymer and plastics industries. The current state of GPC/SEC is not conducive to supporting these initiatives due to its lack of resolution for novel and complex polymeric entities, the time required to achieve satisfactory separation, and the volume of solvent consumed per analysis.

Advanced Polymer Chromatography (APC) is a breakthrough technology that addresses these challenges in the polymer industry. It combines low-dispersion system fluidics with rigid, small particle columns of a wide range of pore sizes. The system was designed to meet challenges associated with polymer chromatography including reliability with unfavorable solvents and exceptional repeatability and stability during analysis.

The ACQUITY Advanced Polymer Chromatography System defines the ultimate in polymer peak resolution, particularly for low molecular weight oligomers. Getting more information about your polymers in less time means better characterization, better asset utilization, and ultimately a better solution for achieving your corporate sustainability goals.

**Applications**
- Polymer research and development
- Routine chromatographic polymer analysis

**Key Technologies**
- ACQUITY APC System
- ACQUITY Refractive Index, Absorbance, and Evaporative Light Scattering Detectors
- ACQUITY Isocratic Solvent Manager
- ACQUITY Single Zone Column Manager
- Empower Software with GPC option
- ACQUITY APC AQ and XT Columns

Learn more at www.waters.com/apc
ACQUITY APC System.
Waters introduces a new category of separations science with the ACQUITY UPC² System.

Complementary to both GC and LC, convergence chromatography (CC) provides orthogonal and increased separation power using compressed CO₂ as the primary mobile phase. Designed to solve routine and complex separation challenges, the ACQUITY UPC² System enables unparalleled selectivity through combinations of solvent and stationary phase that are simply not possible by any other chromatographic technique.

In addition, the ACQUITY UPC² System dramatically streamlines the entire workflow of sample analysis due to its ability to directly inject high organic extracts resulting from a majority of sample preparation techniques. By effectively eliminating the most time-consuming steps of preparing a sample, the ACQUITY UPC² System enables exceptional gains in your laboratories productivity, moving the science of your business forward.

Applications
- Normal phase applications
- Achiral analysis
- Chiral analysis
- Pharmaceutical medicinal chemistry
- Chemical materials
- Natural products
- Traditional medicines
- Food safety
- Environmental
- Academia

Key Technologies
- ACQUITY UPC² System
- ACQUITY UPC² Binary Solvent Manager
- ACQUITY UPC² PDA Detector
- Single and tandem quadrupole mass detectors
- Empower and MassLynx software
- Connections INSIGHT Remote Services
- ACQUITY UPC² Columns
- Analytical Standards and Reagents
ACQUITY UPC² System.
The ACQUITY UPLC I-Class System provides the most powerful solution to the most critical need in separations science today – successfully analyzing compounds that are limited in amount or availability amid a complex matrix, more rapidly than ever before. Developed to produce the most accurate and reproducible separations, this system delivers the most information possible while accelerating laboratory results. The ACQUITY UPLC I-Class has dramatically decreased dispersion for the highest resolution, and features rapid injection cycles and sample throughput with reduced carryover. These attributes make it a candidate to replace your current LC as the best-in-class inlet for any mass spectrometer, ultimately providing best-in-class UPLC performance.

Applications
- LC/MS analysis
- Qualitative and quantitative analyses
- Analysis of samples in complex matrices
- Trace impurity analysis
- High-throughput and open access separations
- Method development

Key Technologies
- ACQUITY UPLC I-Class System
- ACQUITY UPLC I-Class System with 2D Technology
- Binary solvent management
- Superior inlet to mass spectrometry independent of vendor
- ACQUITY PDA and TUV Detectors
- ACQUITY UPLC single and tandem quadrupole mass detectors
- Empower or MassLynx software
- Local Console Controller for handheld remote operation
- Connections INSIGHT® Remote Services
- ACQUITY UPLC BEH, CSH, and HSS Columns
- Analytical Standards and Reagents
ACQUITY UPLC I-Class System.
The ACQUITY UPLC H-Class System combines the chromatographic performance of UPLC with the flexibility of quaternary solvent blending. Designed to accommodate both UPLC and legacy HPLC assays, the ACQUITY UPLC H-Class System facilitates existing HPLC methods, or the transfer to full UPLC separations when you are ready. In addition, the flexibility of multiple column selection (up to six), integrated solvent selection valve (access to six additional solvents), and software features such as Auto•Blend Plus™ (for on-line pH blending and/or control of ionic strength), make it ideally suited for method development.

Engineered with a bio-inert flow path, the ACQUITY UPLC H-Class Bio System is ideal for orthogonal RP, SEC, IEX, and HILIC quaternary bioseparations.

The ACQUITY UPLC H-Class Method Development System combines UPLC-quality chromatography with software that automates the development of an optimal Design of Experiment space to consistently produce rugged, robust LC methods in a fraction of the time.

Applications
- HPLC and UPLC analyses with easy method transferability
- Routine analysis
- Method development
- Quality assurance and quality control

Key Technologies
- ACQUITY UPLC H-Class System
- ACQUITY UPLC H-Class Bio System
- ACQUITY UPLC H-Class Method Development System
- ACQUITY UPLC H-Class System with 2D Technology
- Quaternary Solvent Management
- Auto•Blend Plus Technology
- ACQUITY PDA, TUV, RI, FLR, and ELS Detectors
- Single (SQD) and tandem (TQD) quadrupole detectors
- Empower or MassLynx software
- Local Console Controller for handheld remote operation
- Connections INSIGHT Remote Services
- ACQUITY UPLC BEH, CSH, and HSS Columns
- ACQUITY UPLC Method Development and Method Transfer kits
- Analytical Standards and Reagents
ACQUITY UPLC H-Class System.
2D technology is for chromatographers who require additional capabilities to gain sensitivity and selectivity, perform orthogonal separations, and increase speed of analysis. ACQUITY UPLC Systems can meet these needs by controlling multiple valves and pumps for 2D separations.

Waters’ 2D technology solutions for ACQUITY UPLC systems are purposefully built, from plumbing to software to valve control, to provide reproducible and consistent results for various applications, enabling organizations to implement 2D applications more easily and run them reproducibly in their lab, with the ability to transfer them anywhere.

**Applications**
- Trapping with and without At-Column Dilution
- Heart cutting
- Parallel column regeneration

**Key Technologies**
- ACQUITY UPLC I-Class
- ACQUITY UPLC H-Class
- ACQUITY UPLC H-Class Bio
- ACQUITY UPLC
- MassLynx Software
- ACQUITY UPLC BEH, CSH, and HSS Columns
ACQUITY UPLC I-Class System with 2D Technology.
The PATROL UPLC® Laboratory Analyzer and PATROL UPLC Pilot Analyzer systems are designed for reaction monitoring and optimization experiments. They integrate sample preparation and Real-TIME LC™ analysis into an automated analyzer, providing fast and accurate quantitative results to define a process method.

Waters PATROL UPLC Process Analyzer System is a real-time Process Analytical Technology (PAT) system that detects and quantifies complex multiple component manufacturing samples and final product directly on the production floor.

The validated methods transferred from the PATROL UPLC Laboratory Analyzer and PATROL UPLC Pilot Analyzer System to the PATROL UPLC Process Analyzer ensure regulatory compliance on the manufacturing floor, as well as results that improve operational efficiency, deliver quantifiable ROI, and increase profits.

Applications
- Real-TIME LC analysis in manufacturing processes
- Quantitative measurement of Critical Quality Attributes
- Process development
- Process cleaning validation
- Process reaction monitoring
- Process/development cell culture
- Process purification fraction analysis
- Development reaction optimization and characterization
- Development forced degradation
- Development and process fermentation
- Pilot scale-up

Key Technologies
- PATROL UPLC Laboratory Analyzer System
- PATROL UPLC Pilot Analyzer System
- PATROL UPLC Process Analyzer System
- Online and atline configurations
- Empower Software
- NuGenesis Platform
- ACQUITY UPLC BEH, CSH, and HSS Columns
- Connections INSIGHT Remote Services
PATROL UPLC Pilot System.
The nanoACQUITY UPLC® System has been designed for microbore to nanoscale separations to attain the highest sensitivity and chromatographic resolution for UPLC and UPLC/MS. This system allows you to achieve separations at NanoFlow™ rates without flow-splitting, while offering significant improvements in robustness, reproducibility, and simplicity of operation over conventional nanoflow separations technologies. The nanoACQUITY UPLC System is also available with 2D capabilities for increased peak capacity and dynamic range.

**Applications**
- Biomarker discovery
- Protein identification
- Protein characterization
- Metabolite identification

**Key Technologies**
- nanoACQUITY UPLC System
- nanoACQUITY UPLC System with 2D Technology
- nanoACQUITY System with HDX Technology
- Atlantis®, Symmetry®, HSS T3, and BEH chemistries
- Waters MS and HDMS technologies
- Superior mass spectrometry inlet
- nanoACQUITY UPLC Columns
nanoACQUITY UPLC System.
The nanoACQUITY UPLC System with HDX Technology leverages nanoscale UPLC separations and high-resolution MS to answer important questions about changes in protein conformation with confidence by stringently controlling temperature-sensitive parts of the HDX sample workup.

Based on Waters’ proven UPLC Technology, the system delivers outstanding chromatographic resolution, superior reproducibility, and reliability while running newly updated, industry-leading DynamX Data Analysis Software, shortening time between experiment and answers. It’s also available in both manual and automated formats.

**Applications**
- Biopharmaceutical product development
- Drug binding to a protein target molecule
- Protein-protein interactions
- Structural biology research

**Key Technologies**
- nanoACQUITY UPLC System
- nanoACQUITY UPLC HDX Manager (manual or automated)
- Waters MS and HDMS technologies
- nanoACQUITY UPLC Columns
- ProteinLynx Global SERVER™ Application Manager
- DynamX 2.0 Software
- Superior mass spectrometry inlet
nanoACQUITY UPLC System with HDX Technology.
Whatever your application, the Alliance HPLC and Breeze™ 2 HPLC systems offer you proven solutions for all of your HPLC requirements – today and in the future. These systems are synonymous with dependable, routine performance, and versatility.

Applications
- Fine and specialty chemicals
- Food safety analysis
- Environmental analysis
- Quality control
- Clinical/diagnostics
- Pharmaceutical

Key Technologies
- Alliance HPLC and HPLC/MS systems
- Alliance HPLC Dissolution System
- BioSuite Bioseparation Columns
- Breeze 2 HPLC systems
- Empower or MassLynx software
- UV/Vis, PDA, ELS, FLR, RI, Electrochemical, and Conductivity HPLC detectors
- Analytical Standards and Reagents
Alliance HPLC System with 2998 PDA Detector.
Unique MS Technology for Advanced Capabilities

Waters is dedicated to engineering robust technology platforms that provide tangible improvements in the performance, versatility, and simplicity of its mass spectrometers.

The differentiating technology of our Travelling Wave devices, found within all of our mass spectrometers, adds capabilities that go beyond the boundaries of conventional mass spectrometry.

Key Technologies

- **T-Wave™** – An innovative device allows the precise manipulation of ions in a mass spectrometer in order to enhance sensitivity and analytical speed
- **ScanWave™** – Enhances the sensitivity of tandem quadrupole MS/MS scans
- **StepWave** – Ground-breaking technology increases the overall sensitivity of a mass spectrometer thirty-fold
- **TriWave®** – Allows ion mobility separations to take place inside a QTof instrument
- **MS<sup>E</sup>** – The ultimate technology for comprehensive, reproducible profiling and characterization
- **QuanTof™** – Provides outstanding sensitivity and the highest levels of Tof performance
- **RADAR™** – Allows collection of highly specific quantitative data for target compounds while enabling the simultaneous visualization of all other components in the sample matrix
- **Universal Ion Source Architecture** – Provides the broadest range of experimental options
“This new LC/MS/MS system will allow our innovative method development team to improve methods and speed up method development for analytically complex compounds to help advance our clients’ drug development programs.”

Beyerlein D.
Vice President of Global Operations
MicroConstants
MicroConstants Press Release March 2, 2011

When compared to earlier generation mass spectrometer models, MicroConstants experienced a forty-fold increase in sensitivity with compounds tested internally in negative electrospray ionization mode. The significant increase in sensitivity can be attributed primarily to the system’s StepWave ion-transfer technology. This off-axis design dramatically increases the efficiency of ion transfer from the ion source to the quadrupole MS analyzer while, at the same time, actively eliminating undesirable neutral contaminants.
The SQ Detector 2, the ultimate mass detector for chromatography, is a simple, robust, and versatile mass detector that has been designed to be the perfect partner for UPLC, UPC², HPLC, and GC, as well as preparative HPLC and SFC. Our Engineered Simplicity™ design philosophy ensures every analyst can consistently generate the highest quality data with minimal training.

The universal ion source architecture provides total flexibility and versatility to maximize experimental choices, enabling LC/MS, SFC/MS, GC/MS, and direct sample analysis on a single platform. This capability allows you to extract the maximum amount of data from the widest range of compounds, whatever your separation requirements.

Applications
- Open access mass confirmation
- Impurity analysis
- Cleaning validation
- Intact mass analysis of high molecular weight species
- Rapid screening with Atmospheric Solids Analysis Probe (ASAP)
- Mass directed purification
- Open access purification
- Polymer analysis
- Authenticity and origin studies
- Raw material conformity checking
- Adulteration studies

Key Technologies
- ACQUITY UPLC I-Class System
- ACQUITY UPLC H-Class System
- ACQUITY UPC² System
- AutoPurification™ System
- Alliance HPLC System
- IntelliStart™
- ESCi®
- Universal Ion Source Architecture
- ASAP
- Atmospheric Pressure GC (APGC)
  ion source for fast swapping between LC and GC Applications
- Analytical Standards and Reagents
ACQUITY UPLC I-Class System.

ACQUITY UPLC H-Class System.

SQ Detector Z.

ACQUITY UPC² System.

AutoPurification System.
Mass Spectrometry
Time of Flight MS

Xevo G2-S Tof is a time-of-flight mass spectrometer designed for the identification and quantification of the broadest range of compounds in the most complex and challenging samples.

The Xevo G2-S Tof incorporates StepWave ion optics for unsurpassed levels of durable sensitivity and uses proven quantitative time-of-flight (QuanTof) and UPLC/MS² technologies to deliver superior UPLC-compatible mass resolution, matrix-tolerant dynamic range, quantitative performance, mass accuracy and speed of analysis – while completely cataloging your samples in a single analysis. Xevo G2-S Tof enables close integration with UltraPerformance LC® to deliver the highest quality, most comprehensive information, to let you make the right decisions, quickly and confidently.

Applications
- Peptide mapping experiments
- Intact protein analysis
- Metabolite identification
- Discovery DMPK quantitation
- Food safety screening
- Environmental monitoring
- Accurate mass open access
- Toxicology screening

Key Technologies
- StepWave
- QuanTof Technology
- UPLC/MS²
- Universal Ion Source Architecture
- IntelliStart Technology
- Workflow Specific Informatics
- Analytical Standards and Reagents

Featured Solution
- Biopharmaceutical Platform Solution with UNIFI
ACQUITY UPLC I-Class System
with the Xevo G2-S ToF.
Xevo TQ-S, Xevo TQ MS, and Xevo TQD are the analytical tools of choice for all of your quantitative UPLC/MS/MS applications, delivering the ultimate in versatility for a wide variety of applications — both quantitative and qualitative.

Xevo TQ-S features a revolutionary new off-axis ion-source technology, known as StepWave to allow you to quantify and confirm trace components at the lowest possible levels in the most complex samples.

Both Xevo TQ MS and Xevo TQ-S offer ScanWave Technology for enhanced product ion scanning, and Xevo TQ-S, Xevo TQ MS, and Xevo TQD all have RADAR — for collection of highly specific quantitative data for target compounds and simultaneous visualization of all other sample components.

With Xevo TQ-S, Xevo TQ MS, and Xevo TQD, you will develop methods that bring drugs to market faster, identify a broader array of food contaminants, and report reliable forensic data with complete confidence.

Applications

- Environmental and food safety analysis
- Pharmaceutical discovery and development
- Regulated bioanalysis, peptide and protein bioanalysis
- Clinical assays
- Metabolite screening
- Biomarker verification

Key Technologies

- Xevo TQ-S
- Xevo TQ MS
- Xevo TQD
- IntelliStart Technology
- TargetLynx™, Quanpedia™, QuanOptimize™ and OpenQuan™ application managers
- Universal Ion Source Architecture
- Analytical Standards and Reagents

Featured Solution

- Regulated Bioanalysis Platform Solution with UNIFI
ACQUITY UPLC I-Class System with Xevo TQ-S.
Xevo G2-S QTof is designed for scientists who need to identify, quantify, and confirm the broadest range of compounds in the most complex and challenging samples.

The Xevo G2-S QTof incorporates StepWave ion optics for unsurpassed levels of durable sensitivity and uses proven quantitative time-of-flight (QuanTof) technology to simultaneously deliver superior UPLC-compatible mass resolution, matrix-tolerant dynamic range, quantitative performance, mass accuracy, and speed of analysis, allowing close integration with UltraPerformance LC® and delivering the highest quality, most comprehensive information. This enables you to make the right decision, quickly and confidently.

Applications
- Biopharmaceutical characterization
- Metabolite identification
- Forensic toxicology
- Food analysis
- Environmental research
- Chemical industry research
- Proteomics studies

Key Technologies
- StepWave
- QuanTof Technology
- UPLC/MS®
- UPLC/FastDDA
- Universal Ion Source Architecture
- IntelliStart Technology
- Workflow-specific Informatics
- Analytical Standards and Reagents

Featured Solutions
- Screening Platform Solution with UNIFI
- Metabolic Identification Application Solution with UNIFI
- Pesticide Screening Application Solution with UNIFI
- Biopharmaceutical Platform Solution with UNIFI
ACQUITY UPLC I-Class System
with Xevo G2-S QTof.
To access the highest levels of information content from your most analytically challenging samples, or to utilize analytical tools to make scientific discoveries not possible by any other means, look no further than SYNAPT® G2-S.

SYNAPT G2-S combines revolutionary StepWave (high sensitivity ion optics with in-built noise rejection), QuanTof (High resolution, Quantitative Time-of-flight) and High Definition MS™ (high-efficiency T-Wave ion mobility mass spectrometry) technologies to provide the highest sensitivity, selectivity, and speed of analysis.

With High Definition MS (HDMS), you will be able to dramatically improve results when compared to the use of chromatographic and mass resolving power alone, afforded by the ability to differentiate samples by size, shape, charge, and mass.

Applications
- Life sciences and clinical biomarkers
- Pharmaceuticals and biopharmaceuticals
- Chemicals, polymers, and petrochemicals
- Food profiling
- Food R&D
- Environmental
- Fundamental MS research

Key Technologies
- StepWave, High Definition MS, and QuanTof
- Data dependant analysis (DDA)
- Data independent analysis (MS²)
- CID (Collision induced dissociation) and ETD (electron transfer dissociation)
- High Definition Imaging (HDI™) MALDI
- MassLynx Software and “HDMS ready” application managers
- IntelliStart Technology

Featured Solution
- Omics Research Platform Solutions with TransOmics Informatics
SYNAPT G2-S HDMS System.
When you need to extract the maximum amount of information from a diverse range of compounds, you require the ultimate in ionization flexibility and performance.

Waters Universal Ion Source Architecture enables the widest range of ionization techniques to be utilized universally across a single analytical platform. Providing the highest performance, without compromise, the ionization source options are quick and easy to interchange.

- **ESI/APCI/ESCi** – For the analysis of polar and semi-polar analytes.
- **APPI/APCI** – For the analysis of semi-polar and non-polar analytes.
- **Atmospheric pressure Solids Analysis Probe (ASAP)** – For the direct, rapid analysis of volatile and semi-volatile solid and liquid samples using atmospheric pressure ionization.
- **Atmospheric Pressure GC** – Enables rapid switching from LC/MS/MS to GC/MS/MS applications on a single instrument platform. For the analysis of volatile and semi-volatile compounds of low and intermediate polarity.
- **nanoFlow™ ESI** – For the analysis of minute sample amounts when coupled with the nanoACQUITY UPLC System.
- **TRIZAIC UPLC nanoTile** – Micro-fabricated nanofluidic UPLC technology, using sub-2-µm particle chemistries to provide the very best chromatographic performance simply and without compromise.
- **MALDI** – Available on the SYNAPT G2-S only, see page 52.
“The chromatographic resolution and sensitivity of this novel GC/MS instrument [APGC] surpassed all expectations... every molecule we have thrown at the APGC ion source has responded well and the flexibility for optimizing the signal of choice has opened up a whole new avenue of opportunity for research.”

Mosely J.
Senior Research Officer,
Department of Chemistry
Durham University

nanoACQUITY UPLC System
with SYNAPT G2-S HDMS.
Waters offers an extensive range of GC/MS platforms to support a diverse array of GC/MS applications.

Key to this flexibility is the Waters Atmospheric Pressure GC (APGC) source. APGC can be used on any Waters MS system with our universal source architecture (SYNAPT, Xevo, and SQ Detector 2).

The APGC source enables fast switch-over between LC/MS and GC/MS, utilizing soft ionization to deliver high sensitivity spectra, which are rich in molecular ion information. In combination with our other instrument capabilities – like ion mobility, MS^3, and MS/MS – the APGC provides a versatile tool that extends compound coverage in your laboratory without the need for an additional instrument.

For dedicated electron impact GC/MS application, Waters offers the AutoSpec Premier™, a double-focusing magnetic sector instrument for ultra-trace quantification of POPs.

### Applications
- Comprehensive characterization
- Chemical materials research
- Analysis of volatiles and semi-volatiles
- Ultra trace quantification of POPs

### Key Technologies
- Atmospheric Pressure GC (APGC)
- AutoSpec Premier
- Analytical Standards and Reagents
SYNAPT G2-S HDMS System with APGC.
Waters MV-10 ASFE® System extracts chemical compounds using supercritical CO₂ in place of organic solvents. The result is an extract with little or no residual solvent, superior purity and yield, and lower operating costs compared to traditional normal phase solvent extraction systems.

Supercritical fluid extraction (SFE) is capable of extracting compounds from solid matrices, isolating the analyte of interest without altering the taste, aroma, or chemical composition of your product.

**Applications**
- Extraction and fractionation of edible fats and oils
- Separation of tocopherols and other antioxidants
- Detoxification of shellfish
- Production of flavors, spice extracts, herbs, dietary supplements, and more
- Precision parts cleaning
- Desolvation within tablets
- Steroids, polymer/monomer separation

**Key Technologies**
- High pressure CO₂ pump
- Multiple sequential extraction capability
- ChromScope Software for easy-to-use instrument control and data management
MV-10 ASFE System.
Purification scientists around the globe are excited by the latest advancements in supercritical fluid chromatography (SFC). SFC technology uses CO₂ as its main solvent, and has become a critically important solution for preparative laboratories that want to be greener – less normal phase solvent to buy; less to dispose of – and SFC means much less dry down time resulting in higher throughput. Waters offers a complete line of SFC purification solutions that are uniquely flexible and scalable, regardless of whether you are purifying samples in the milligram or kilogram range.

**Applications**
- Impurity isolation and purification
- Natural products and traditional Chinese medicines
- Pharmaceutical
- Chiral/achiral analysis
- Normal phase applications

**Key Technologies**
- Prep 100 SFC UV and MS systems
- Investigator SFC System
- Empower, MassLynx, or ChromScope software
- FractionLynx™ Application Manager
- Viridis SFC Columns
- Bulk Scale Systems: Prep 80q, 200q, and 350q
- Analytical Standards and Reagents
Prep 100 SFC System with SQ Detector 2.
The AutoPurification System offers performance without compromise. Uniquely flexible, the system has been designed to optimize all isolation and purification requirements by utilizing high-performance instrumentation, robust chemistry, and easy-to-use software, all within one platform.

Advanced application managers, including OpenLynx™ and AutoPurify™ as well as Auto•Blend™ Technology, allow you to maximize your laboratory productivity with minimal system intervention. When high-throughput is a requirement, choosing the MS system for maximum specificity and selectivity will result in high purity and recovery of complex mixtures.

**Applications**
- Compound isolation and purification
- UV or mass-directed fraction collection
- Milligram to kilogram amounts
- Pharmaceutical
- Biopharmaceutical
- Natural products and traditional Chinese herbal medicines

**Key Technologies**
- AutoPurification LC and LC/MS systems
- MassLynx Software
- FractionLynx Application Manager
- OpenLynx Open Access Application Manager
- Preparative Optimum Bed Density (OBD) Columns
AutoPurification System with SQ Detector 2.
Developed for entry-level personal purification requirements, the Prep 150 LC System is a perfect combination of intuitive software and robust performance. This system is perfectly suited for initial workflow criteria where rapid preparative separations of complex mixtures are required.

Available as a manual or an automated system, it can accommodate sample ranges from a handful to hundreds. Easily scale up to our more sophisticated AutoPurification System when full automation and higher levels of specificity and purity are required.

### Applications
- Compound isolation and purification
- Milligrams to grams amounts
- Pharmaceutical
- Biopharmaceutical
- Natural products and traditional Chinese herbal medicines

### Key Technologies
- ChromScope Software
- UV/Vis, PDA, ELS, HPLC Detectors
- 2707 Autosampler
- 2545 Binary or Quaternary gradient modules
- Fraction Collector III
- Preparative Optimum Bed Density (OBD) Columns
- Analytical Standards and Reagents
Prep 150 LC System.
Be Assured. Choose Waters Global Services.

Waters Global Services focuses on optimizing Waters products with superior service, support, upgrades, training, and Waters Quality Parts.

Only the Waters Service teams have the most in-depth and up-to-date knowledge of the advanced science and technologies that provide the foundation for Waters systems. This enables Waters to help you maximize system uptime, increase laboratory productivity, and meet stringent compliance requirements.

With 94 offices in more than 50 countries, Waters maintains a strong global presence. Whether your company is a single-location lab or a large multinational organization, Waters Global Services provides you with the expertise and responsiveness you need.

Services and Products

- Instrument and software support plans
- Automated qualification for Waters and Agilent Systems
- Instrument and software upgrades
- Software services
- Laboratory analytics
- Performance maintenance
- Classroom, onsite, and web-based education and training
- Application and technical support
- Remote monitoring and diagnostics
- Waters Quality Parts
- Relocation services
- Asset management

Choose Waters for Proven Satisfaction

For eleven consecutive years, an independent quality auditing firm has ranked Waters Global Services best-in-class in providing expert technical knowledge, quick resolution of system issues, and process support.¹
